

FINAL REPORT

RAC Responses to Public Questions and Concerns

Part of Task 6: Technical Support for Public Involvement

August 1999

*Submitted to the Colorado Department of Public Health
and Environment, Disease Control and Environmental
Epidemiology Division, Rocky Flats Health Studies
in partial fulfillment of Contract No. 100APPRCODE 391*

"Setting the standard in environmental health"



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RAC RESPONSES TO CITIZEN CONCERNS AND QUESTIONS

INTRODUCTION

Early in Phase II, *Radiological Assessment Corporation (RAC)* met with members of the public to identify and discuss their concerns about the project. Transcripts of this meeting were recorded and used to understand criticisms about the project up to that point. These issues were catalogued and listed in a notebook for a permanent project record so each one could be addressed to the best of our ability. As Phase II continued, *RAC* added to the list of citizen's concerns, and developed responses for them. Many of the questions, issues, and concerns addressed in this document were taken from a variety of documents, letters, and transcripts of the early Health Advisory Panel (HAP) meetings held for the Historical Public Exposure Studies on Rocky Flats were given to *RAC* by Environmental Information Network (EIN) on February 22, 1995 following an extensive meeting held with them. It was not possible to respond to every issue, but from 210 questions and issues that were raised, responses were developed for more than 200 of them. The few that remain unresolved are the result of the issues being beyond the scope of the study or simply from a lack of historical information with which to work. *RAC* has responded to each issue and has cited supporting letters, technical memoranda and reports when appropriate. In some cases, issues are still being resolved, and these are noted.

This *RAC* Response Report follows others that *RAC* has prepared to address specific concerns raised by members of the public. The following are attached to this communication:

- *Letter and Responses to Questions Submitted to the HAP by Dr. Kemper, from Dr. J.E.Till, dated January 31, 1994;*
- *Response to Question 11 from W.A. Kemper regarding actinide concentrations in cattle grazing near the Rocky Flats Plant, S.K. Rope, 3/10/94.*
- *Responses to Concerns Raised by Environmental Information Network and Concerned Citizens to the Rocky Flats Dose Reconstruction Project, dated May 13, 1994;*
- *Responses to Questions from William Kemper Concerning the Rocky Flats Dose Reconstruction Project, June 4, 1994.*

The concerns have been organized by topic, and each identified by the source document. The source document is underlined and the individual issues from that document are listed below each document. Some of the issues are numbered for *RAC*'s tracking purposes. The responses are italicized. Some of the issues identified were addressed by the HAP, and they follow the items addressed by the *RAC* Team.

An [Appendix](#) at the back of this document lists the following supporting documentation and correspondence listed in chronological order. All *RAC* task reports that are referenced in the responses may be obtained from *RAC* or from the Colorado Department of Public Health and Environment. The following documents are listed in the [Appendix](#):

- *Verification of the Ralston School Soil Sampling Location Following the 1957 Fire, RAC Team, 7/93*

-
- *Health Advisory Panel Policy on Interviews, John Till, 9/6/94*
 - *Bibliographic Search Risk Factors for Beryllium, Plutonium, Chlorinated Hydrocarbons, B. Shleien, 12/93*
 - *Particle size information for plutonium, P.G. Voillequé, 1/4/94*
 - *Letter Regarding Methyl Ethyl Ketone as a Contaminant of Concern, P. McGavran, 8/13/94*
 - *Status Report of Document Review for the Rocky Flats Dose Reconstruction Project, T. Winsor, 9/94*
 - *Final Progress Report-Document Search of Department of Energy Documents Washington, DC Area for Rocky Flats, B. Shleien, 11/18/94*
 - *Question of the possible occurrence of criticality at the Rocky Flats Plant, P. Voillequé, 1/5/95, 1/26/95*
 - *Response to question about the mass of plutonium per volume of air, S.K. Rope, 2/28/95*
 - *Response to question about early air sampling filters, P. Voillequé, 4/7/95*
 - *The Question of Historical Carbon Tetrachloride Use in the Denver Area, P. McGavran, 4/17/95*
 - *Response to Comments on the outreach presentation for the Rocky Flats Study, J.E. Till, 4/18/95*
 - *Response to Question About the Increased Sensitivity of Alcoholics to Carbon Tetrachloride, P. McGavran, 4/27/95*
 - *Response to Question about the Ribbon Laser System at Rocky Flats, P. Voillequé, 5/7/95*
 - *Examination of Mass Balance Accounting as a Means for Estimating Pu Releases; HAP transcripts 5/95, P. Voillequé, 5/95*
 - *Collection Efficiency of Ambient Air Samplers, S.K. Rope, 5/19/95*
 - *Acquiring and Analyzing Incinerator Ash Samples for Dioxins, P. McGavran, 7/29/95*
 - *A Summary of Incinerators Operating in the Denver Area, P. McGavran, 7/95*
 - *Interviews: Status and Projections, T.F. Winsor, 8/95*
 - *Hypothetical Exposure Assessment Using On-Site Air Monitoring Data (What's in an Average?), S.K. Rope, 12/95*
 - *Document Review and Interviews: Status and Projections, T. Winsor, 4/96*
 - *Follow-up on documents in boxes from unknown origin and request for copies, K. Meyer, 4/96*
 - *Review of boxes of indices of microfilm documents at RFP, K. Meyer, 4/18/96*
 - *Question of CCl₄ being used as a fire extinguisher at Rocky Flats, P. McGavran, 6/21/96*
 - *Question about the availability of pond sediment sampling data for CCl₄, P. McGavran, 6/26/96*
 - *903 Area Dosimetry Spreadsheet: How does it work and what does it tell us?, J.M. Weber, A.S. Rood, 9/96*

INTERVIEWS AND CONFIDENTIALITY; FOLLOW-UP

Confidentiality Policy

Letter to Patricia Nolan (CDH) from EIN dated 3/22/94. It addresses the following areas:

Breaching personal security of information sources; 13. confidentiality

Response: The Confidentiality policy was instituted to address this, and is described in: Health Advisory Panel Policy on Interviews, J. Till, September 6, 1994, and Letter to P. Elofson-Gardine from J. Till responding to comments on the outreach presentation for the Rocky Flats Study, dated April 18, 1995. The status of interviews has been reported periodically throughout Phase II, for example: Interviews: Status and Projections, T. Winsor, August 1995

Memo to John Till (RAC) from Paula Elofson-Gardine (EIN) dated 4/5/94. Regarding Confidentiality policy.

Response: RAC revised the confidentiality policy and it was agreed to by the HAP and the public. The policy was reworded with the help of a number of members of the public.

Concerns raised by members of the public to the Rocky Flats Dose Reconstruction Project
Memo from EIN to CDH dated 3/14/94. EIN comments regarding - Briefing Book 15: Concerns
raised by members of the public to the Rocky Flats Dose Reconstruction Project (RF DRP).

8d. Failure to use Dr. Edward A. Martell's information and documents provided to ChemRisk in the study.

Response: Dr. Martell was interviewed by members of EIN, the HAP, and RAC on February 21, 1995 at NCAR in Boulder, Colorado. Transcripts are available and have been reviewed for information that might be helpful in dose reconstruction.

17. Lack of quality control on records and monitoring. EIN suggest that a roster of employees that have worked certain processes and lines over the years should be obtained for direct and uncensored interviews.

Response: RAC has made an extensive effort to interview former and current plant workers. The confidentiality policy helps assure that comments and individuals remain confidential if requested.

13. Confidentiality.

Response: RAC has made an extensive effort to interview former and current plant workers. The confidentiality policy helps assure that comments and individuals remain confidential if requested. See response above.

Memo from EIN to MGA/Thompson dated 1/26/95. Possible source points for dioxins at RFP.

8a. Independent experts such as Dr. Tom Webster, Dr. John Gofman and others should be consulted on issues related to pharmacokinetics of plutonium exposure and target organs.

Response: Study is considering information by outside experts in developing material for risk uncertainty. A broad range of experts will be asked to review the risk uncertainty report.

Critique of Tasks 3 & 4 Final Draft Report

Letter to Norma C. Morin (CDH) from Thomas P. Courtney, 9/92. Critique of Rocky Flats Toxicological Review and Dose Reconstruction Feb. 92 Tasks 3 & 4 Final Draft Report for CDH Health Advisory Panel, Loews Giorgio Hotel, 24 September 1992. Includes appendices and references.

8/17. ChemRisk failed to interview appropriate people and to follow up on claims.

Response: The interview process and number were greatly expanded in Phase II.

Letter to Norma C. Morin (CDH) from Thomas P. Courtney, 9/92. Critique of Rocky Flats Toxicological Review and Dose Reconstruction Feb. 92 Tasks 3 & 4 Final Draft Report for CDH Health Advisory Panel, Loews Giorgio Hotel, 24 September 1992. Includes appendices and references.

17. The 50 former RF employees who called into the FBI during the raid should have been interviewed, or have been used to formulate the appropriate interview questions to ask.

Response: Still need to resolve.

12/16/92 Technical Session Minutes

27b. 1969 Fire: EIN suggested that the HAP follow up with LeRoy Moore because he had recently reviewed their litigation material (Tel: 303 444 6981)

Response: LeRoy More will review this draft report if he wishes. His comments will be carefully considered in the final report.

30. Paula Elofson-Gardine asked RAC to contact Dr. Herb Feeley, Head of the DOE Environmental Measurements Lab regarding soil sampling and air monitoring data from the World Net Monitoring System as their monitors were removed due to severe resuspension interference with readings for world wide fallout

Response: Dr. Feeley was contacted and he referred RAC to Dr. Larson; RAC contacted Larson of the Environmental Measurement Laboratory (see Letter from P.G. Voillequé dated April 10, 1995) and members are still in touch with him. The issue of removing samplers because of local resuspension could be the case, but it may be more likely that their research was completed.

17. Request that RAC contact line employees about incidents and possible releases

Response: RAC has attempted to contact employees who worked on site as part of the interview process. We have also tried to contact any employees recommended to us by the public.

Letter to Marilyn Case (RAC) from Paula Elofson-Gardine (EIN) dated 10/8/93. Response to the proposed keywords for use in the database search. Topics of interest to EIN are evident from the keywords suggested.

7e. EIN request that Rosalie Bertell, Alice Stewart and Ed Radford be contacted for alternative sources of documents that may have been overlooked thus far in the study.

Response: Through the peer review process and our work on plutonium risk, RAC has considered research by these and other individuals. The HAP invited Dr. Alice Stewart to the

March 1997 HAP quarterly meeting. Dr. Stewart discussed her work with the panel during the technical work session, and with the public on the evening of March 4, 1997.

An Open Response to Colorado Department of Health (CDH) Newsletter "The Update" submitted by EIN 5/25/93.

8. The CDH and HAP have refused to make use of the knowledge and information available from local expert scientists.

Response: We believe we have responded and worked extensively with local scientists during Phase II. (may want to add references)

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

8/26. Recommendation that additional documents not of plant origin be considered for developing the source terms - Dr. Johnson interviews to establish dust loading on HEPA filters - Poet and Martell Survey.

Response: This is an important issue that is addressed in our approach to document review.

9/23/92 Technical Session Minutes and 9/24/92 Technical Session Minutes

17. Lack of follow up with RFP employees: to provide a quality check for missing data - at least to verify that something happened at a certain time to establish a time line of events

Response: RAC has attempted to contact employees who worked on site as part of the interview process. We have also tried to contact any employees recommended to us by the public.

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

42. 903 Pad source term: failure to talk to workers e.g. Jerry Hardin

Response: RAC did talk with Jerry Hardin and other workers in its interview of workers.

Potential Security Issues Related to Sharing Information about the 1957 Fire and other events at RFP.

Fax from Paul Voillequé (RAC) to Normie Morin (CDH) dated 6/11/93. Release of classified information and the EIN.

Response: Confidentiality policy was instituted to address this.

Letter to Normie Morin (CDH) from EIN dated 6/9/93. Follow up on letter of inquiry from CDH dated 6/7/93.

Response: Confidentiality policy was instituted to address this.

Memorandum from EIN to CDH, dated 7/7/92. Secretarial/Public Relations Problems.

2/21. Lack of follow-up, incorporation of public comments or suggestion into the study

Response: RAC has tried to follow up on all questions and comments given to us. If there are issues that RAC has failed to follow up on, these should be documented and we will do our best to address them.

Letter to ENSR from EIN, dated 7/13/92. Response to fax sent 7/10/93 containing material for review.

8. Local expert consultants, Dr. Martell, Dr. Biggs, should be utilized for release estimate problems and routine and accidental release extrapolation.

Response: RAC has used local scientists extensively throughout the study. Dr. Martell was interviewed by members of EIN, the HAP, and RAC on February 21, 1995 at NCAR in Boulder, Colorado. Transcripts are available and have been reviewed for information that might be helpful in dose reconstruction. RAC has sent a number of technical memoranda and reports, including portions of the Task 4 Report, Evaluation of Historical Monitoring Records, to Dr. Biggs for review.

DOCUMENT REVIEW

Letter from EIN to CDH dated 6/1/94. An Open Letter to the HAP welcoming the new DOE representative on the HAP and clarifying EIN's background and level of involvement with the CDH RFP Dose Reconstruction Project

7b. EIN would like the meaning of Q-clearance to be clearly defined to the public.

Response: Q clearances are the top level of clearance required by researchers to access classified information on site. RAC arranged to have Ms. Janet Nesheim, classification officer with Worldwide Security Services Ltd at the Rocky Flats Plant, attend the HAP meeting on March 5, 1997 for an informal discussion over lunch with those individuals interested in the topic. As a result of this discussion, RAC is preparing a technical topics paper on clearance and classification issues. Kathleen Meyer had a conference call with Paula Elofson-Gardine and Ms. Susan Hurst in April 1997 to develop the key questions for the paper.

Memorandum from EIN to CDH, dated 7/7/92. Secretarial/Public Relations Problems.

7f. Phase I document search methodology was flawed. (keyword search)

Response: HAP. RAC has greatly expanded the search of historical records.

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

8/26. Recommendation that additional documents not of plant origin be considered for developing the source terms - Dr. Johnson interviews to establish dust loading on HEPA filters - Poet and Martell Survey.

Response: This is an important issue that is addressed in our approach to document review.

40. Request that alternative aerial photos be used that show proximity of communities and drinking water supplies

Response: RAC has obtained alternative photos that help with this issue and others in the dose reconstruction.

Concerns raised by members of the public to the Rocky Flats Dose Reconstruction Project

Memo from EIN to CDH dated 3/14/94. EIN comments regarding - Briefing Book 15: Concerns raised by members of the public to the Rocky Flats Dose Reconstruction Project (RFDRP).

5e/5d. Municipal firefighters at the 1957, 1969 fires; Grass or hay fires as a potential sources of contamination in the community. EIN wants these considered.

Response: RAC investigated the use of municipal firefighters in these fires. We have not been able to determine if this was the case. Nothing exists in documentation supporting this idea. RAC is aware that the site did hire students during the summer of 1969 to help with the fire clean-up. Many of these students were sons of the current Rocky Flats employees. RAC did interview one person who was one of the summer students.

Memo from EIN to CDH dated 3/14/94. EIN comments regarding - Briefing Book 15: Concerns raised by members of the public to the Rocky Flats Dose Reconstruction Project (RFDRP).

16. EIN did not consider that the VG-4 sampling location (Ralston School) had been adequately documented to resolve the issue. A copy of the appropriate documentation was requested by EIN.

Response: RAC has carefully reviewed a number of documents related to the issue of sampling following the 1957 fire at various locations, including the Ralston school. We have reviewed this issue thoroughly over several HAP meetings, have drafted a technical memorandum in 1993 on this, and have sent material to EIN for their review. This issue was also resolved at the Mar 16, 1994 Technical Session of the HAP meeting. A portion of the transcript follows:

MS. HURST: Anyway, to move on, our next issue was the sampling location that was referenced in Dr. Johnson's report for the '57 fire concentrations, the ash. And that they had somehow decided that Dr. Johnson had made a mistake in his document. And I think that it's presumptuous of someone that didn't know how well Dr. Johnson did his research to assume he made a mistake on the location of the sampling site. And, to me, it's kind of inappropriate to do that, as far as we're concerned, because, indeed, if it was -- if the plume went as high and as far south as we think, that sampling location, it took the -- well, what was it, 14,000 DPMs?

MS. ELOFSON-GARDINE: I don't have it off the top of my head anymore.

MS. HURST: Up on Lookout Mountain. I know why -- they don't want to think it went that far until we had absolute black and white documentation. That sampling site was, indeed, in Arvada. We must assume that his original document was correct.

DR. LICHTENSTEIN: Actually, the RAC had reviewed that. They have their response here.

MS. HURST: I know.

DR. LICHTENSTEIN: It is from -- reviewed the document last night, because I wanted to make sure we were clear on this. There's a reference, when they are talking about -- when he's talking about Ralston School, there's a reference in there, specifically, to the Hammond article, which then addresses it. Kathleen presented that to this committee, definitely showed the reference, where the location of the site was, and it's very clear. It's interesting, also, in the Johnson article that, in the illustration, and I have the article right here, but in the illustration of the location of the schools, and the count, disintegration count, per minute counts that are there, the text -- and they are switched between the text and the figures. So, I think that it's just --that was, obviously, an editing error that slipped through on that particular article, but, I think, as a panel member, and having seen the information that RAC

has presented, I think this resolved the issue. They have definitely demonstrated the site of the Ralston School and it was the south southeast site, not the one up on Lookout Mountain.

MS. ELOFSON-GARDINE: We were asking -- I think we asked for this before, a copy of any confirmation that they found. We have not received that as yet.

DR. K. MEYER: I sent that whole packet, the copy of Dr. Johnson's paper and of the original paper, along with our write-up, six months ago.

MS. ELOFSON-GARDINE: We did not receive it.

DR. TILL: We did send it right after the meeting.

DR. K. MEYER: I will send several copies to all of you.

DR. MANGIONE: Send it certified mail or hand-delivered.

DR. K. MEYER: Okay. I will do that.

3i. EIN state that data do exist regarding offsite groundwater contamination. EIN require reimbursement if they are requested to locate these documents.

Response: RAC has been interested in reviewing records held by EIN and would make every effort to pay for costs associated with copying this information. RAC and EIN are in the process of scheduling a time for review of the EIN document collection.

Letter to Marilyn Case (RAC) from Paula Elofson-Gardine (EIN) dated 10/8/93. Response to the proposed keywords for use in the database search. Topics of interest to EIN are evident from the keywords suggested.

7e. EIN request that Rosalie Bertell, Alice Stewart and Ed Radford be contacted for alternative sources of documents that may have been overlooked thus far in the study.

Response: Through the peer review process and our work on plutonium risk, RAC has considered research by these and other individuals. The HAP invited Dr. Alice Stewart to the March 1997 HAP quarterly meeting. Dr. Stewart discussed her work with the panel during the technical work session, and with the public on the evening of March 4, 1997.

Letter to EIN from Norma C. Morin (CDH) dated 6/7/93.

Requesting EIN to provide the HAP with publicly available information that they have on the 1957 Fire as offered at the May 26 HAP meeting.

Response: RAC continues to try to work with EIN to obtain copies of relevant documents.

Letter to Patricia Nolan (CDH) from EIN dated 6/1/93. RE: Health Studies on Rocky Flats. Concern that severe problems associated with the CDH Health Advisory Panel and the status of the study are not being addressed or resolved.

2/7f. A major concern of EIN is that ChemRisk only evaluated approximately 1/3 of the documents they found in archives and in all likelihood had missed a tremendous amount of information.

Response: RAC has greatly expanded the document review in Phase II, including a systematic search of all classified records in Building 881. Our document review process has been communicated in a number of letters and reports: Letter to P. Elofson-Gardine from J. Till responding to comments on the outreach presentation for the Rocky Flats Study, dated April 18, 1995; Status Report of Document Review for the Rocky Flats Dose Reconstruction Project, T. Winsor; September 1994; Bibliographic Search Risk Factors for Beryllium,

Plutonium, Chlorinated Hydrocarbons, B. Shleien, December 1993; *Final Progress Report - Document Search of Department of Energy Documents Washington, DC Area for Rocky Flats*, B. Shleien, November 18, 1994; *Document Review and Interviews: Status and Projections*, T. Winsor, April 1994; *Letter to A. Wilson regarding follow-up on documents in boxes from unknown origin and request for copies*, K. Meyer, April 1996 (All correspondence is included in the [Appendix](#) in chronological order).

9/24/92 Technical Session Minutes; critique of the Tasks 3 & 4 Report (Phase I) was presented by Tom Courtney at the meeting. Key items noted in the minutes are listed below.

7g. Risk studies and other studies on RFP carried out by other DOE facilities, such as LLL, Oak Ridge, Albuquerque and Los Alamos should be declassified and released to the public
Response: Documents stored at other DOE facilities and related to Rocky Flats have been sought and reviewed during Phase II. We have not found information of this type that is useful in the study.

5g/3i. Dames and Moore (Golden) conducted a 3-D water plume study of contamination. He recommended HAP review this.

Response: This report has been considered in preparing the surface water report.

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

8/26. Recommendation that additional documents not of plant origin be considered for developing the source terms - Dr. Johnson interviews to establish dust loading on HEPA filters - Poet and Martell Survey.

Response: This is an important issue that is addressed in our approach to document review.

38. Have there been further studies utilizing wide beam laser scanning to quantify the existing contamination? This technique was referenced in the 1986 RFP Radioecology Report by George Setlock as an additional technology utilized for observing the radionuclide contamination and dust resuspension in the area.

Response: This issue is addressed in a letter to Susan Hurst by Paul Voillequé, dated May 7, 1995 (All correspondence is included in the [Appendix](#) in chronological order).

8/26. Recommendation that additional documents not of plant origin be considered for developing the source terms - Dr. Johnson interviews to establish dust loading on HEPA filters - Poet and Martell Survey.

Response: This is an important issue that is addressed in our approach to document review.

2. ChemRisk have overlooked document sources. ChemRisk used keyword searches rather than systematic searches of entire documents to locate documents. Significant information will have been overlooked.

Response: Phase II has greatly expanded the document search.

Health Advisory Panel's Outreach Effort

Letter from EIN to MGA/Thompson dated 1/10/95. MGA/Thompson Outreach Presentation Outline for Historical Public Exposures Studies on Rocky Flats.

7d. A special category of classified documents exists that will not be identified in the searches.

Response: RAC has tried to look at all relevant historical records, classified and unclassified. We do not believe there have been records of a higher classification that we have not seen.

Letter from EIN to CDH dated 6/1/94. An Open Letter to the HAP welcoming the new DOE representative on the HAP and clarifying EIN's background and level of involvement with the CDH RFP Dose Reconstruction Project.

7c. How were the prosecution Church files used in the study. EIN provided these to CDH/Quillin 1/93?

Response: The Church files were reviewed by Dr. Kathleen Meyer and Mr. Paul Voillequé. Although some helpful ideas were found that was considered in the study (for example the amount of plutonium released during the 1957 fire) little useful information for dose reconstruction was noted. (See letter to William Kemper June 2, 1994) (All correspondence is included in the [Appendix](#) in chronological order).

DATA EVALUATION, GAPS, AND INCONSISTENCIES

An Open Response to Colorado Department of Health (CDH) Newsletter "The Update" submitted by EIN 5/25/93.

3b/3c. Sampling deficiencies have not been addressed adequately. For example Equipment not collecting all the proper particulate sizes of concern.

Response: Task 4 addresses collection efficiencies of air samplers and filters as a function of particle size and wind speed, as well as other sources of uncertainty and bias. In addition, Sue Rope wrote a memorandum, Collection Efficiency of Ambient Air Samplers on May 19, 1995. (All correspondence is included in the [Appendix](#) in chronological order).

Monitoring data logs have been mismanaged.

Response: RAC believes that the most original records are the best source for obtaining the truth about what was going on in the plant. These records form the basis of dose reconstruction. The possibility of falsified data must always be taken into account. That is why RAC believes in answering a question or making a calculation from as many different independent approaches as possible.

Falsification of measurements -

Response: RAC agrees that data could have been falsified. However, in dose reconstruction it is not possible to identify data that are accurate or not accurate due to falsification. In considering which data are used, RAC believes that the most original records are the best source for obtaining the truth about what was going on in the plant. These records form the basis of dose reconstruction. The possibility of falsified data must always be taken into account. That is why RAC believes in answering a question or making a calculation from as many different independent approaches as possible. During interviews, this question was

asked to a number of individuals. Although most interviewees admit that there may be errors through human error, most believe that most data are accurate. Unless the interviewee requested anonymity, all interview records are part of the public record.

Calibrations have been off, batteries depleted, equipment turned off ---> resulting in records that do not reflect the actual situation at the time.

Response: There is no way to address all these issues directly; some data sheets mention pump burn out and all these issues are addressed as well as possible based on the documentation that is available. These issues are being addressed extensively in Task 4 and in a number of other shorter communications such as: Letter to P. Elofson-Gardine from J. Till responding to comments on the outreach presentation for the Rocky Flats Study, dated April 18, 1995 (All correspondence is included in the [Appendix](#) in chronological order).

9/24/92 Technical Session Minutes

3b. Poor monitoring, unreliable data: e.g. with a major incident, a big plume goes by, gets blown away with high winds, the exposure has already occurred with little evidence left.

Response: In Phase II, RAC considers the usefulness and limitations of many historical data. We address collection efficiencies of air samplers and filters as a function of particle size and wind speed, as well as other sources of uncertainty and bias in the Task 4 Report and in other communications (See Information about Cascade Impactors, P. Voillequé, March 15, 1993; Letter from P. Voillequé to W.G. Biggs on January 4, 1994). The concern about a big plume being missed by an air sampler is plausible but inconclusive. With an acute event like the 1957 fire, the air monitors might not pick up the plume and that is why we have approached this assessment differently with dispersion modeling. For secondary resuspension of deposited material, it is very unlikely that the air samplers would miss the material because the wind speeds and directions vary over a long period of time. These latter issues are addressed in the risk assessment reports. RAC's meteorological modeling and the 903 pad source term reports include analysis of this issue, too. 1995 (All correspondence is included in the [Appendix](#) in chronological order).

Statement published by EIN, and titled "Problems Regarding the Colorado Department of Health Rocky Flats Dose Reconstruction Project" dated 3/10/93 and signed by nine members of the Sampling Subcommittee who described themselves as concerned public, knowledgeable citizens, and members of the scientific community. The signatories state that the CDH and their contractors have:

2. Failed to follow up on data inaccuracies and incompleteness; Failed to correct and acknowledge skewed raw data used in constructing this study.

Response: In Phase II, RAC addresses collection efficiencies of air samplers and filters as a function of particle size and wind speed, as well as other sources of uncertainty and bias in the Task 4 Report.

Health Advisory Panel's Outreach Effort

Letter from EIN to MGA/Thompson dated 1/10/95. MGA/Thompson Outreach Presentation Outline for Historical Public Exposures Studies on Rocky Flats.

3c. Many records have been falsified

Response: RAC agrees that data could have been falsified. However, in dose reconstruction it is not possible to identify data that are accurate or not accurate due to falsification. In considering which data are used, RAC believes that the most original records are the best source for obtaining the truth about what was going on in the plant. These records form the basis of dose reconstruction. The possibility of falsified data must always be taken into account. That is why RAC believes in answering a question or making a calculation from as many different independent approaches as possible. During interviews, this question was asked to a number of individuals. Although most interviewees admit that there may be errors through human error, most believe that most data are accurate.

Letter to Patricia Nolan (CDH) from EIN dated 3/22/94.

2. Large data gaps in Phase I work

Response: RAC agrees there are data gaps for both Phase I and Phase II. This does not infer, however, that reasonable dose reconstruction cannot be performed. Gaps in data can be handled through uncertainty analysis.

Letter from EIN to MGA/Thompson dated 1/10/95. MGA/Thompson Outreach Presentation Outline for Historical Public Exposures Studies on Rocky Flats.

3b. Poor monitoring data exist.

Response: This issue is correct. Task 4 evaluates all environmental monitoring data, and identifies data that are of high or poor quality.

Concerns raised by members of the public to the Rocky Flats Dose Reconstruction Project

Memo from EIN to CDH dated 3/14/94. EIN comments regarding - Briefing Book 15: Concerns raised by members of the public to the Rocky Flats Dose Reconstruction Project (RFDRP).

3b/8c. EIN want Dr. Harvey Nichols and Dr. Gale Biggs to be consulted over monitoring deficiencies and Pu transport.

Response: RAC has exchanged letters with Dr. Biggs and others (See Letters regarding mass of Pu per volume of air from P. Voillequé to Dr. W.G. Biggs, April 15, 1994 and from S.K. Rope to Dr. W.G. Biggs on February 28, 1995; Letter describing filters that were used for early in-plant and effluent air sampling at the RFP from P.G. Voillequé to G.K. Marsh, April 7, 1995). His ideas and those of other independent scientists are being considered in our work. Also, Dr. Biggs and others who wish to review the RAC reports on dispersion have been able to do so should they desire. Task 4 evaluates all environmental monitoring data, and identifies data that are of high or poor quality.

22 Page letter to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

3b/8c. Issue of unreliable monitoring data -Dr. Gale Biggs, Dr. Harvey Nichols.

Response: Task 4 evaluates all environmental monitoring data, and identifies data that are of high or poor quality. RAC has interviewed Dr. Nichols and reviewed his reports:

Nichols H. and M. Nichols. Pollen and Spores as Radionuclide Transport Vectors of Radionuclide Particles at the Rocky Flats Facility, Colorado. First Progress Report no. COO-2736-1, October 15, 1975. University of Colorado, Boulder. Archived in Environmental Master File no. 7419,. Rocky Flats Plant, Golden, Colorado.

Nichols, H. Some Aspects of Organic and Inorganic Particulate Transport at Rocky Flats. Final Report on Contract EY-76-S-02-2736. University of Colorado, Boulder, Colorado. and interviewed him.

The principal investigator for this work was Dr. Harvey Nichols, of the University of Colorado, under contract to the Energy Research and Development Administration. The purpose was to determine: (1) whether radionuclide particles in the size range of tenths of a micron (micrometer, abbreviated as Tm) are transported by larger particles, such as plant spores and pollen grains (size range several microns to 150 Tm), and (2) whether the low- and high-volume air samplers presently in use at the RFP efficiently collect such larger particles. Large numbers of pollen and spores, released seasonally, have a known ability to travel very long distances in air, a propensity for attracting other particles (by static charge), and for carrying them attached to the elaborately-sculptured (and sometimes sticky) pollen walls (Nichols 1976).

Sampling began in July 1975. "Static samplers" for pollen were vaseline-gel-coated plastic slides and gel-coated tapes attached to glass cylinders. These were placed at four main study areas in a NW-SE transect with respect to the Rocky Flats industrial area. One area was the southeast perimeter fence near the 903 pad. In addition, at power pole AG82 (SE of the pad on the perimeter fence), the RFP provided an Anderson cascade impactor in a standard protective housing and a low-volume air sampler without a housing. The other three sites were viewed as upwind and downwind controls. Pollen and air samplers were changed on a weekly basis for the first 8 weeks starting July 29, 1975, then biweekly as pollen release declined after September. Soil samples were collected at a variety of locations.

Samples of soil, fiberglass filters, and coated tapes were irradiated with neutrons in the TRIGA reactor at the Denver Federal Center. Polycarbonate film in close contact with the samples was etched, examined microscopically for fission tracks, and then the position of fission tracks versus pollen grains was examined. "Star bursts" resulted from particulates whereas single tracks indicated dispersed radionuclides. A star at the same location as a pollen grain would implicate pollen as a transporter of the radionuclide. The authors state that cellulose nitrate film was used to establish that a particle was plutonium as opposed to uranium, but it is not explained how this is achieved.^a Cylindrical static pollen samplers were placed at 75-cm intervals from ground level up to 15 m on a meteorological tower at Rocky

^a The theory behind the fission track method is not well explained in these reports. RFP studies by Hayden could be examined for additional information.

Flats Plant to study the variation of pollen transport with height. The final report (Nichols 1976) states that very few fission tracks resulted from irradiation of these collectors and thus the static samplers were abandoned in favor of reliance on the powered (air) samplers.

Initial conclusions of the progress report were that: (1) RF air samplers are not efficient for sampling large (50-100 micron) pollen particles.^b (2) Large radionuclide particles have not been found attached to pollen; further time is needed to allow search for smaller particle attachment. (3) Snow drift sites near Indiana St. have fissile particle concentrations about as high as the location near the 903 area.^c (4) An elapsed time of four weeks is needed to allow autoirradiation of alpha sensitive film placed on the soil surface at these locations to determine whether any of this activity is due to plutonium (Nichols and Nichols 1975).

The final report (Nichols 1976) of this study also stated that the association between pollen grains and fissile radioactive particles was negative. Thus, there was no indication that out of the many large radionuclide particles transported across the site any significant number were transported by pollen grains or spores. The authors do conclude that the very abundant, light, and large pine pollen is not efficiently collected by low-volume ambient air samplers.

We can make some observations on the significance and conclusions of the pollen studies with respect to the assessment of historical exposures of the public to Rocky Flats plutonium.

1. The hypothesis that plutonium particles might be transported long distances by large but buoyant pollen particles is an interesting one which was tested by these studies. The results of the studies gave no indication that there was an association between pollen and radionuclides.

2. Small plutonium particles might be transported long distances by themselves, without association with pollen or other organic substances. Those particles are then subject to dilution, dispersion, deposition, and blending into the worldwide fallout plutonium so that it is impossible to distinguish them from plutonium particles from other sources.

3. If plutonium particles had been associated with larger pollen particles, they would not be respirable, as reflected in the low collection efficiency of the samplers for the large pollen particles. If and when small particles disassociate from large particles, those small respirable particles would then be efficiently collected by ambient air samplers.

4. The fission track method used in this study does not identify the radionuclide causing the tracks. (Dr. Nichols acknowledges in his reports that radiochemical methods are needed to be certain of the radioactive material being detected. He indicated in an interview (Winsor 1994) that he wanted to do arrange for more in-depth analyses, but could not get support.) The uranium mine 5 miles west of Rocky Flats is mentioned as the source of uranium, but all soils naturally contain uranium and thorium.

^b This conclusion is in agreement with many other studies of the collection efficiency of ambient air samplers (see DATA QUALITY section of Chapter III). Large particles are not respirable.

^c No assessment of the contributions of natural or fallout background radioactivity was made by Nichols.

5. We believe that there is not enough consideration of the background and fallout to conclude that the fission tracks observed on samples from "accumulation areas" such as snow banks are due to dispersion of Rocky Flats materials. We agree that nonuniform distribution of radionuclides occurs in the environment due to accumulating and scouring phenomena.

Sue Rope wrote up his work on pollen for the Task 4 report and sent the section to Dr. Nichols for his comments. We have not heard back from him as of August 15, 1997.

3a. Presence of many different alpha emitting radionuclides confounding estimates of Pu emissions based on gross alpha measurements

Response: RAC agrees and has addressed this limitation in the Task 4 report.

3b. Data are inaccurate and (releases) grossly underestimated - Dr. Biggs

Response: It is assumed this comment refers to effluent air monitoring data. Paul Voillequé has addressed this issue in his assessment of routine releases; the releases were underestimated and Paul has addressed this.

30. Statement that EML removed its monitors from RFP because the proximity of the plant skewed the fallout statistics

Response: This is a possibility; the issue of removing samplers because of fallout could be the case, but may be more likely that their research was completed. We have been in contact with the EML regarding other work. Dr. Feely of the EML referred RAC to Dr. Larsen; RAC contacted Larsen of EML and we are still in contact. In Chapter 3 of the Task 4 report, there is a chronology of the air monitoring equipment that they used. RAC did not discuss that issue with them but it is not unreasonable to assume that that could have been a reason that RFP releases were much higher than fallout.

Letter from EIN to MGA/Thompson dated 2/26/94. Response to a letter from MGA/Thompson dated 2/23/94.

3c. Falsification of records at RFP.

Response: RAC agrees that data could have been falsified. However, in dose reconstruction it is not possible to identify data that are accurate or not accurate due to falsification. In considering which data are used, RAC believes that the most original records are the best source for obtaining the truth about what was going on in the plant. These records form the basis of dose reconstruction. The possibility of falsified data must always be taken into account. That is why RAC believes in answering a question or making a calculation from as many different independent approaches as possible. During interviews, this question was asked to a number of individuals. Although most interviewees admit that there may be errors through human error, most believe that most data are accurate.

Letter to MGA/Thompson from EIN dated 2/18/94. Review of a 12 page fax from MGA/Thompson distributed 2/15/94.

3b. Historical monitoring records are worthless.

Response: Task 4 evaluates all environmental monitoring data, and identifies data that are of high or poor quality.

Health Advisory Panel's Outreach Effort

Letter from EIN to CDPHE dated 2/8/95. Response to CDPHE's response.

3f. EIN would like the issue of primary and secondary dispersion or fallout patterns of releases by Rocky Flats to be examined in more detail. In particular, weaknesses in integrated spatial analyses of soil data using kriging techniques (3d); combining or compositing samples misses hot spots ((3e) averaging methods); EIN ask if false low values are caused by dilution of samples by collection of a profile that is then added to the composite sample?

Response: Looking at resuspension and dispersion in great depth. Soil data are not being used for dosimetry, only to check with model predictions.

Response: Averaging and hot spots are being looked at through spreadsheet calculations (Sue Rope technical memo and Jill Weber memo) (All correspondence is included in the [Appendix](#) in chronological order).

Response: All monitoring data are carefully considered as to their value. RAC has examined sample bias and efficiency and is considering this in its use of monitoring information.

Letter to Norma C. Morin (CDH) from Thomas P. Courtney, 9/92. Critique of Rocky Flats Toxicological Review and Dose Reconstruction Feb. 92 Tasks 3 & 4 Final Draft Report for CDH Health Advisory Panel, Loews Giorgio Hotel, 24 September 1992. Includes appendices and references.

3j. Data from the Rocky Flats 1981 and EPA 1989 aerial americium and gamma ray surveys were not considered in sufficient detail. He drew attention to emissions other than alpha from Plutonium.

Response: The value of aerial surveys has been considered (reference Duane Schmidt technical memo). The decision was made by the HAP not to carry out aerial surveys.

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3b/8c. Monitoring deficiencies raised by Gale Biggs and discussed in some detail

Response: All monitoring data are carefully considered as to their value. RAC has examined sample bias and efficiency and is considering this in its use of monitoring information.

Conversation between Jennifer Lamb (ChemRisk) and Gale Biggs, dated 3/5/92.

3b/3k. HEPA filter efficiencies, particle size distributions, sample probe positions

Response: This issue is addressed in the Task 4 report. See above response.

FIRES AT THE ROCKY FLATS PLANT

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26. 1957 Fire. Concern regarding the limited data that ChemRisk cited. Comments on the 1957 Fire report summarized by Dr. Carl Johnson in the early 1970s given to them by EIN referenced a dozen RFP reports. The document described an event of long duration, not short duration. Why was this not followed up on?

Response: RAC's analysis of the 1957 fire considers this and other issues related to the event (See Estimated Airborne Releases of Plutonium During the 1957 Fire in Building 71, P.G. Voillequé, May 1995; and Comments on the 1957 fire analysis and question of representative sampling for Building 71 exhaust duct, an exchange of six letters between Paul Voillequé and LeRoy Moore, from June through October 1995.

16. The two elementary schools cited in this report (Ralston and Semper) were found to have significant contamination, and were located east and south of the RFP.

Response: Information on soil sampling and location of the Ralston school was presented at the May 1993 HAP Technical Work Session and was considered in the technical memo prepared by Dr. K.R. Meyer and PG. Voillequé (Verification of the Ralston School Soil Sampling Location Following the 1957 Fire, dated July 1993). Other monitoring information is considered in the 1957 fire risk report. (All correspondence is included in the [Appendix](#) in chronological order).

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27. 1969 Fire source term data sources ignored

Response: Phase II addresses the 1969 fire.

9/24/92 Technical Session Minutes; critique of the Tasks 3 & 4 Report (Phase I) was presented by Tom Courtney at the meeting. Key items noted in the minutes are listed below.

5k. - undocumented uranium fires in Bldg. 881, leading to an accumulation "elephants foot" of uranium in the elevator shaft that almost reached critical mass - stainless steel floors; open air blow torch cutting of uranium plates by blacksmiths at RFP.

Response: Fires did occur in a number of facilities around the RFP, especially during high production times. RAC reviewed the Phase I work and has focused their efforts on plutonium releases to the air from the 1957 fire in Building 771, the 1969 fire in Building 776/777 and the 903 storage area as the major sources of offsite exposure. RAC believes that it is unlikely there are significant undocumented releases or that if they did occur the impact is masked by the effects of larger releases being taken into account. The Task 4 report helps to better understand if there were large undocumented releases. Based on our analysis of the environmental data, it is not likely large undocumented releases occurred.

5k. Bldg. 776/771 fires are poorly documented: two explosions occurred in the ducts, many believe several nuclear explosions occurred. Plutonium hold up in ducts was poorly understood at that time. The 776 explosions knocked out the electronics in the building.

Response: These fires are being reanalyzed extensively in the source term reports.

5k. Waste drums from the major fire events are stored in 991 for high level waste contamination.

Response: Still need to address , include a visit to 991. Are there drums stored there? This issue has been addressed in part in looking at the waste drums shipped offsite. See transcript of December 9, 1994 meeting:

MR. VOILLEQUE:There are uncertainties in the amount of waste that was shipped off site. And--and those uncertainties have a big bearing on the uncertainty of the material unaccounted for. Measuring plutonium in waste, particularly in--in complex matrices that--that have differing--different shielding properties is a complicated thing even--even with the barrel counters and the--and the waste can counters that are available today. And the capability that, the technique--oh. I thought I fixed that. That showed up in the spell checker, and I thought I fixed that. I guess didn't correct it. I apologize. Pardon.

CHAIRWOMAN MANGIONE: We thought you were picking up Helen's pronunciation.

MR. VOILLEQUE: Anyway, the point is that the capability to make measurements of--of the amount of material and waste at a time was not what it is today. And even today, it's--it's uncertain. I have done a little digging. I know the question has been asked several times about what happened, what happened to the waste, the fire waste. Any plutonium waste that went to Idaho between September of '57 and--and mid-'62 when the last of the cleanup was--was done, went into the buried waste at Idaho Falls or at the INEL, then the national reactor testing station. And that material was placed in pits and then covered with dirt. And some of those pits have flooded. The material has been mixed in the soil. There really isn't any way of accessing material that was shipped from Rocky Flats that has waste from--from the fire. And incidentally, the same is true of--of the waste that was sent after the '69 fire. Some of that may have been buried. Burial stopped in 1970. But after that, the material was placed in what's called retrievable storage. But retrievable storage is--is drums on a pad covered by a layer of plywood and then another layer of drums and that whole thing covered with a big mound of dirt. So even though it's theoretically retrievable, it's practically inaccessible. So there--there isn't an opportunity to go back and take samples of--of that material or to--to do any better accounting for it than was done at the time.

5k. Explosions in 771 and 776/7: contamination from these fires is stored in drums in the 991 (771?) tunnels and was not shipped offsite as claimed. Plutonium that had accumulated in the ductwork could have been the source of the explosion.

Response: Paul Voillequé has evaluated the possibility of a criticality and concluded that it could not have occurred (See Exchange of 4 letters between P.G. Voillequé to Dr. W.A. Kemper on the question of the possible occurrence of criticality at the RFP, January 1995). The historical records do not indicate that a criticality on site actually happened. Although we understand the absence of information in the historical records does not mean such an

event happened, we found no evidence in the monitoring data to support this claim. (All correspondence is included in the [Appendix](#) in chronological order).

37. Test the barrels for Cs among other contaminants to quantify fire releases.

Response: RAC has determined that the barrels are inaccessible.

MASS BALANCE

Health Advisory Panel's Outreach Effort

Letter from EIN to CDPHE dated 2/8/95. Response to CDPHE's response.

4. EIN is convinced that a mass accountability of all of the processes would have been a more accurate method for determining areas and contaminants of concern.

Response: Mass balance cannot be used due to the lack of quantitative information. See Paul Voillequé memo of May 1995: Examination of Mass Balance Accounting as a Means for Estimating Plutonium Releases (All correspondence is included in the [Appendix](#) in chronological order).

Letter from EIN to CDH dated 6/1/94. An Open Letter to the HAP welcoming the new DOE representative on the HAP and clarifying EIN's background and level of involvement with the CDH RFP DRP.

4. EIN suggest that a mass balance of releases from the RFP to extrapolate dispersion of contaminants to the communities is the only way to evaluate the Dose Reconstruction because of data problems, poor and inaccurate monitoring at the RFP.

Response: See response to 4 above for the mass balance issue. Task 4 of Phase II addresses the limitations of monitoring data.

An Open Response to Colorado Department of Health (CDH) Newsletter "The Update" submitted by EIN 5/25/93.

4. Mass balance accountability is the most reliable approach for quantifying releases.

Response: Mass balance cannot be used due to the lack of quantitative information. See Paul Voillequé memo of May 1995: Examination of Mass Balance Accounting as a Means for Estimating Plutonium Releases (All correspondence is included in the [Appendix](#) in chronological order).

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4a. Difficulty with using a mass balance approach to quantify source terms

Response: See response above.

Letter(22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

4/5h. Request for a materials balance and waste accountability for the Critical Mass Lab.

Response: See response above.

USE OF SOIL DATA

Health Advisory Panel's Outreach Effort

Letter from EIN to CDPHE dated 2/8/95. Response to CDPHE's response.

3f. EIN would like the issue of primary and secondary dispersion or fallout patterns of releases by Rocky Flats to be examined in more detail. In particular, weaknesses in integrated spatial analyses of soil data using kriging techniques (3d); combining or compositing samples misses hot spots ((3e) averaging methods); EIN ask if false low values are caused by dilution of samples by collection of a profile that is then added to the composite sample?

Response: Looking at resuspension and dispersion in great depth. Soil data are not being used for dosimetry, only to check with model predictions.

Response: Averaging and hot spots are being looked at through spreadsheet calculations (Sue Rope technical memo and Jill Weber memo.)

Response: All monitoring data are carefully considered as to their value. RAC has examined sample bias and efficiency and is considering this in its use of monitoring information.

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

3e. Concern that averaging surface soil concentrations artificially reduces the result

Response: The effect of averaging results and the issue of hot spots are being looked at through spreadsheet calculations. This has also been addressed in a technical memo and is discussed in the Task 4 report. (Sue Rope technical memo and Jill Weber memo.)

43. Concern that RFP has overcorrected for the background concentrations thus underestimating contamination.

Response: A technical memorandum on background plutonium concentrations in soil is part of the Task 4 report; soil measurement data are not used directly in exposure assessments.

POTENTIAL RELEASE SOURCES AND CHEMICALS OF CONCERN

Health Advisory Panel's Outreach Effort

Letter from EIN to CDPHE dated 2/8/95. Response to CDPHE's response.

5. EIN consider that the top 5 to 10 incidents or releases from RFP should have been derived and investigated. Using ChemRisk Phase I findings where the top three incidents or releases of concern were identified ignores significant incidents and releases from RFP.

Response: HAP. RAC has looked at several additional instances such as the 1969 fire. Also, RAC evaluated several other possible sources of release (see letter to William Kemper) in trying to respond to this issue. RAC looked thoroughly through the historical records for releases that were not reported. Nothing of substance has been found. Environmental monitoring suggests that there were no other significant releases other than those being addressed.

6. Important contaminants of concern have been dropped from the study. EIN's perception is that many of the 8000 materials of concern were dismissed as significant contributors because ChemRisk thought that the data matrix would be unwieldy

Response:

dioxin (6a)—Dioxin has been considered thoroughly in Phase II. RAC discussed the dioxin and incinerator issues at the technical sessions of the Health Advisory Panel, and experts in the field were invited to participate in a day-long meeting with the HAP. RAC has prepared several reports and technical memoranda on the topic:

[Analysis of Dioxin Emissions and Risks from the Rocky Flats Plant Incinerators: Methods for Assessing the Release of Dioxins; Review of Incinerators and Other Combustion Sources at the Rocky Flats Plant and Bounding Estimate Calculations for the Incinerator in Building 771; P. McGavran and P.G. Voillequé; August 1995].

[Acquiring and Analyzing Incinerator Ash Samples for Dioxins; P. McGavran; July 1995]

[A Summary of Incinerators Operating in the Denver Area; P. McGavran; July 1995]

asbestos (6b)—other potential contaminants have been considered.

(All correspondence is included in the [Appendix](#) in chronological order).

HAP Technical Session Minutes prepared by EIN

12/15/92 Technical Session Minutes

6a. Dioxin should be a material on concern

Response: Dioxin has been considered thoroughly in Phase II. RAC discussed the dioxin and incinerator issues at the technical sessions of the Health Advisory Panel, and experts in the field were invited to participate in a day-long meeting with the HAP. RAC has prepared several reports and technical memoranda on the topic: Incinerators at Rocky Flats Plant, H. Grogan, March 11, 1994; Analysis of Dioxin Emissions and Risks from the Rocky Flats Plant Incinerators: Methods for Assessing the Release of Dioxins; Review of Incinerators and Other Combustion Sources at the Rocky Flats Plant and Bounding Estimate Calculations for the Incinerator in Building 771, P. McGavran and P.G. Voillequé, dated August 1995; Acquiring and Analyzing Incinerator Ash Samples for Dioxins, P. McGavran, July 1995; A Summary of Incinerators Operating in the Denver Area, P. McGavran, July 1995.

Letter to Norma C. Morin (CDH) from Thomas P. Courtney, 9/92. Critique of Rocky Flats Toxicological Review and Dose Reconstruction Feb. 92 Tasks 3 & 4 Final Draft Report for CDH Health Advisory Panel, Loews Giorgio Hotel, 24 September 1992. Includes appendices and references.

6. The RF OHIS chemical inventory identifies 15,569 items used at the plant. This is more than the 8000 items looked at by ChemRisk. Suggestion is that the ChemRisk list is incomplete.

Response: The list of 8000 chemicals being incomplete is a criticism of Phase I. Dr. Pat McGavran has responded to concerns about missing chemicals of concern on an individual basis.

(All correspondence is included in the [Appendix](#) in chronological order).

5n. Beryllium is underestimated.

Response: Be has been now been thoroughly addressed by Dr. McGavran (See draft report, Estimated Exposure and Cancer Risk from Beryllium Released to the Air from the Rocky Flats Plant, May 1997)

5j. numerous dumping in ditches around RFP: Rock Creek drainage, 771 Bldg. ditch, Woman Creek drainage

Response: Chapter 6 of the Task 4 report and the surface water report address this issue.

5k. Disagrees that no midnight burns took place (776/7 incinerator). Believes that plutonium emissions resulted.

Response: In investigating dioxin and furan releases, all combustion operations at the RFP were evaluated and are described in the dioxin report. The incinerator was assumed to have operated 24 hours a day so burning presumably would have occurred during night and day.

5k. Fires occurred in Bldg. 881 - these need to be considered.

Response: Fires did occur in a number of facilities around the RFP, especially during high production times. RAC reviewed the Phase I work and has focused their efforts on plutonium releases to the air from the 1957 fire in Building 771, the 1969 fire in Building 776/777 and the 903 storage area as the major sources of offsite exposure. RAC believes that it is unlikely there are significant undocumented releases or that if they did occur the impact is masked by the effects of larger releases being taken into account. The Task 4 report helps to better understand if there were large undocumented releases. Based on our analysis of the environmental data, it is not likely large undocumented releases occurred.

5k. The roof on Bldg. 881 was replaced and was broken through, so internal contamination will have been released.

Response: See response above. Based on our analysis of the environmental data, it is not likely large undocumented releases occurred

Health Advisory Panel's Outreach Effort

Letter from EIN to MGA/Thompson dated 1/10/95. MGA/Thompson Outreach Presentation Outline for Historical Public Exposures Studies on Rocky Flats.

6. Significant materials of concern have been glossed over:

Response: Other materials have been evaluated and the process that ChemRisk used in Phase I reviewed. See: Letter to P. Elofson-Gardine from J. Till responding to comments on the outreach presentation for the Rocky Flats Study, dated April 18, 1995. Some materials continue to be studied..

dioxin (6a)— See: Analysis of Dioxin Emissions and Risks from the Rocky Flats Plant Incinerators: Methods for Assessing the Release of Dioxins; Review of Incinerators and Other Combustion Sources at the Rocky Flats Plant and Bounding Estimate Calculations for the Incinerator in Building 771, P. McGavran and P.G. Voillequé, August 1995.

asbestos (6b)— See: Letter to P. Elofson-Gardine from J. Till responding to comments on the outreach presentation for the Rocky Flats Study, dated April 18, 1995

PCBs (6c)— See: Letter to P. Elofson-Gardine from J. Till responding to comments on the outreach presentation for the Rocky Flats Study, dated April 18, 1995

methyl ethyl ketone (6d)—See: Letter Regarding Methyl Ethyl Ketone as a Contaminant of Concern from P. McGavran to EIN, dated August 13, 1994;

acetone (6e)— See: Letter to P. Elofson-Gardine from J. Till responding to comments on the outreach presentation for the Rocky Flats Study, dated April 18, 1995.

(All correspondence is included in the [Appendix](#) in chronological order).

These issues were also discussed at length at a number of HAP Technical Work Sessions. A portion of the transcript from the 9/13/94 meeting follows:

Dr.. McGavran: Okay. Can everybody hear me okay? The next thing on the agenda is, which was right after the dioxin discussion, was about methyl ethyl ketone. In a response to inquiry from EIN, Helen Grogan and I looked into ChemRisk's evaluation of methyl ethyl ketone and the question that was raised by Paula, in June -- I paraphrased here -- a friend that worked in plume processing recently reviewed some of the task reports and commented that methyl ethyl ketone was markedly absent, but has been used in large quantities, and should this be evaluated further as a potential contaminant of concern. And I answered this inquiry with a letter that's in your briefing book, and I just would kind of like to go through that, the information in that letter. This is a good question. Methyl ethyl ketone -- I need to get a -- is a very commonly used solvent. The more accurate name for it is butanone, also refer to its abbreviation, MEK. In the Task 1 and 2 risk report, MEK was listed as part of the Priority 1 chemicals with inventory amounts of 30 kilograms in 1974 and 68.4 kilograms in 1988 with a ratio of 2.28 between the two. Because it has RFD, which is a reference dose, it's a dose corresponding to a no-observable-adverse-effect level, so there's an acceptable daily intake value that's determined by the EPA. Because MEK had a reference dose assigned to it, it was subjected to the Stage 2 screening calculations in Task 2, and because the ratio of allowable to actual quantity estimates was less than one, MEK was excluded from the materials recommended for further evaluation by ChemRisk. MEK is volatile, and it presents an inhalation hazard, but the ChemRisk toxicity criteria value that they used was based on an oral reference dose. And I asked ChemRisk about this. They said the reason that they used the oral reference dose is because it's much lower than the inhalation reference dose. And that the allowable inventory quantity you get if you use the inhalation reference dose, would be 300 times larger than the amount calculated using the oral value. So it would be conservative, and have the allowable quantity be as small as possible. The allowable quantity, based on either the oral or inhalation reference dose, is still much larger than the actual inventory quantities. So this chemical did not qualify as a potential chemical-of-concern.

There's a lot of toxicity information on MEK, because it's the -- it's in lots of commonly used household products, like spray paints and adhesives. And also it's abused by inhalation. People sniff it, inhale it on purpose, because of its euphoric and hypnotic sort of effects. MEK

is also an irritant. It causes irritation of the eyes, nose and mouth. That's sufficient in most cases to prevent overexposure in most people. Another thing to think about is the fact that MEK has been reported to potentiate the toxicity of other chemicals. Its potentiation has kind of a synergistic interaction in lab animals. MEK potentiates the toxicity of chloroform and carbon tetrachloride to the liver, probably by enhancing the metabolism of these chemicals to toxic intermediates. The synergistic effects are primarily a concern of the acute exposure to high levels of this solvent, and they may not be applicable to chronic exposure at levels we might estimate occur off-site. The amounts of MEK released likely have been too low to result in air concentrations off-site that would have caused health effects, even synergistically with chemicals like carbon tetrachloride. The interaction of MEK with these chemicals may be of concern for on-site personnel who work with both solvents, but I don't know for off-site population. Besides causing liver toxicity, chloroform and carbon tetrachloride are possibly human carcinogens, but MEK is not a carcinogen. And it has not been reported to potentiate the carcinogenicity of these chemicals, say, so we're talking about synergism for liver toxicity, not carcinogenicity. MEK also rapidly degrades in the environment. It biodegrades quite well. The highest value I could find for atmospheric half-life was 2.2 days.

Health Advisory Panel's Outreach Effort

Letter from EIN to CDPHE dated 2/8/95. Response to CDPHE's response.

5a. 1973 tritium release that resulted in Broomfield residents demonstrating 18000 pCi/L tritium in their urine - which could result in brain tumors in susceptible populations.

Response: The evaluation of the 1973 tritium release has been done in Phase II. Dose with uncertainty bounds from this event can be found in the Surface Water Report. [Task 2: Characterization of Releases to Surface Water From the Rocky Flats Plant K.R. Meyer; draft February 1996].

5. Source terms that have not been evaluated.

Response: HAP. RAC has looked at several additional instances such as the 1969 fire. Also, RAC evaluated several other possible sources of release (see letter to William Kemper) in trying to respond to this issue. RAC looked thoroughly through the historical records for releases that were not reported. Nothing of substance has been found. Environmental monitoring suggests that there were no other significant releases other than those being addressed.

5b. Bulldozing of tons of uranium ash into Woman Creek drainage that washed down to Standley Lake - which is a public drinking water supply for 3 major suburban cities

Response: Releases to Woman Creek have been addressed within the scope of the surface water analysis by Kathleen Meyer. Releases of material from this area would appear in the analysis to Woman Creek. Terrol Winsor will also look at interviews.

Letter(22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report dated September 21, 1992.

5g. Evaluate groundwater source terms: onsite burial of material from the 69 Fire: hydrogeology study by Dames and Moore, Golden: Contamination from trenches T-2 – T-8

Response: It has been determined by RAC that groundwater is not offsite and therefore is not within the scope of the dose reconstruction. The Dames and Moore report has been considered in preparing the surface water report. We are continuing to resolve the other issues.

5g. Trenches A, B, C should be evaluated as source terms

Response: This is a groundwater issue and is not within the scope of the study. Runoff from these areas has been considered in the surface water chapter in the Task 6 report and in the Surface Water Report [Task 2: Characterization of Releases to Surface Water From the Rocky Flats Plant, K.R. Meyer, draft February 1996].

5f. Spray evaporation must be evaluated as a source term: surface water runoff & resuspension

Response: Addressed in the surface water report; see above response.

5b. Incinerator ash and depleted uranium chips bulldozed over the 881 hillside into the Woman Creek drainage - seasonal torrential rains washing contaminants downstream.

Response: Releases to Woman Creek have been addressed within the scope of the surface water analysis by Kathleen Meyer. Releases of material from this area would appear in the analysis to Woman Creek. Terrol Winsor will also look at interviews.

5d. 1991 haystack fire as a source of offsite contamination (ash 217 times background)

Response: Still needs to be addressed.

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5a. Broomfield residents' exposure following tritium release identified for follow up by Ken Lichtenstein.

Response: Tritium is addressed in an analysis by Dr. Kathleen Meyer in the surface water report. See above response.

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5m. Buildings that need to be treated as source terms

Response: Still need to address. Perhaps this is outside the scope of our study if the concern lies with the demolition of buildings currently onsite.

Letter (22 pages) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

39. 903 Pad is not the only source of resuspended activity from RFP

Response: RAC agrees with this statement and is considering other sources of resuspended activity such as the solar ponds.

5f. Inadequate tracking of spray field contaminants.

Response: Addressed in the surface water report by Dr. Meyer; see above response and reference.

5g. Evaluation of contaminated seepage and standing water from tunnels and vaults as a source term

Response: Addressed in the surface water report by Dr. Meyer.

6. Exclusion of Ethylene oxide (6f), propylene oxide (6g), nitric acid (6h), PCBs (6c) as materials of concern

Response: Other materials have been evaluated and the process that ChemRisk used in Phase I reviewed. See: Letter to P. Elofson-Gardine from J. Till responding to comments on the outreach presentation for the Rocky Flats Study, dated April 18, 1995.

Ethylene Oxide and Propylene Oxide should have been considered.

Ethylene Oxide was listed on the 1974 Dow Chemical Inventory with a quantity of 192,400 kg, but no location was given. It was not listed on the 1988/1989 Inventory. Propylene Oxide was listed on the 1974 Dow Chemical Inventory with a quantity of 1.5 kg, but no location was given. It is not listed on the 1988/1989 Inventory. Both ethylene oxide and propylene oxide were included on the initial list of chemicals of concern for Phase I.

In the Task 3 and 4 Report, August 1992, ChemRisk states, "Some materials were included on the initial Task 2 list of materials of concern because no information was immediately available concerning the nature of their use and associated potentials for release. Even after the extensive searches and interviews performed as part of this Task 3 and 4 effort, uses of four materials at the plant could not be documented. These materials are benzidine, ethylene oxide, propylene oxide, and 1,3-butadiene." Page 107 of the Task 3 and 4 Report says, "no information could be found with regards to a use at the plant which supports the recorded inventory quantity or a potential offsite release". Ethylene oxide and propylene oxide were not evaluated further. Specific information on the use or storage location of these materials has not been found. ChemRisk performed selected searches for ethylene oxide and propylene oxide on document databases and indexes. People interviewed in Phase I with knowledge of processes were reportedly asked about these materials.

Ethylene oxide is used as a chemical intermediate in the synthesis of ethylene glycol and as a fumigant and sterilizing agent. Why such a large amount of this chemical was reported in the 1974 inventory, and what it may have been used for at the RFP is unknown. Propylene oxide is used as a chemical intermediate in the synthesis of plastics. How it was used at the site is also unknown.

The Task 3 and 4 Report, August 1992, included a 'Material Use Profile' for these two compounds. Ethylene oxide was used to sterilize respirator cartridges in the Building 776 laundry for several years in the early 1960s (RE-891[70]). ChemRisk concluded that reports of a possible classified use for ethylene oxide had not been supported in classified document reviews or interviews. Dow Chemical Company may have experimented with both ethylene oxide and propylene oxide as a possible substitute for carbon tetrachloride solvent (RE-891[46]).

In talking to site personnel, ChemRisk was told that the 1974 inventory amount may have been the result of a railroad car of Ethylene Oxide being delivered to the site. It was thought that the car was returned to the manufacturer and the material

was not used. No documentation supporting this explanation has been located. Jeanette Watkins, Senior transportation Specialist at the Rocky Flats Plant, searched for any records pertaining to the use or delivery of ethylene oxide and propylene oxide and found none. She noted that the records currently available do not go back into the 1970s. She asked several people who worked in traffic management during the 1970s and no one recalled any information on these chemicals.

Phase I evaluations eliminated ethylene oxide and propylene oxide, from the list of chemicals of concern for the Dose Reconstruction Study. We have found no new evidence in Phase II which suggests that these compounds were released in quantities to have presented a health hazard off-site. No additional information about the use of these materials has been identified. Therefore, the use and release of these materials can not be evaluated further. If you have additional information on the use, release or disposal of these materials, please let us know.

2. EIN requested ChemRisk to provide a list of which chemicals have been used and in what quantities in the following categories - herbicides, pesticides and rodenticides?

Response: The information needed to do this is not available. Herbicides and pesticides used at the site were considered as a part of Phase I. These chemicals are discussed on page 20 and listed in Table 4-3 in ChemRisk's Phase I, Task I report, March 1991. ChemRisk used the Dow Chemical Company's Inventory of Harmful and Potentially Harmful Materials, January 25, 1974 and the 1988-1989 Chemical Inventory List obtained from the Environmental Restoration and Waste Management Group at Rocky Flats. Both of these inventories listed pesticides. ChemRisk also reviewed and used two other documents: a List of Herbicides used at the Rocky Flats Plant, August 1989, Pesticides Control Program Report and Weed Spraying Operations (Environmental Master File Numbers 60-12240-RR-001 and 60-12240-CO-002, respectively). Unfortunately these documents did not contain information on quantity of these materials applied. No new information on the quantities of these materials purchased, stored or used has been located in Phase II.

6a. Investigate dioxin and furan releases - significance of human error, off conditions, unusual event releases, tanks, vents and incinerator releases

Response: dioxin (6a)— See: Analysis of Dioxin Emissions and Risks from the Rocky Flats Plant Incinerators: Methods for Assessing the Release of Dioxins; Review of Incinerators and Other Combustion Sources at the Rocky Flats Plant and Bounding Estimate Calculations for the Incinerator in Building 771, P. McGavran and P.G. Voillequé, August 1995 (All correspondence is included in the [Appendix](#) in chronological order).

6b. Investigate asbestos releases

Response: asbestos (6b)— See: Letter to P. Elofson-Gardine from J. Till responding to comments on the outreach presentation for the Rocky Flats Study, dated April 18, 1995 (All correspondence is included in the [Appendix](#) in chronological order).

5k. Treatment of Bldg. 881 as a source term for uranium - hold up in the ducts

Response: Fires did occur in a number of facilities around the RFP, especially during high production times. RAC reviewed the Phase I work and has focused their efforts on plutonium releases to the air from the 1957 fire in Building 771, the 1969 fire in Building 776/777 and the 903 storage area as the major sources of offsite exposure. RAC believes that it is unlikely there are significant undocumented releases or that if they did occur the impact is masked by the effects of larger releases being taken into account. The Task 4 report helps to better understand if there were large undocumented releases. Based on our analysis of the environmental data, it is not likely large undocumented releases occurred.

5m. Consideration of releases associated with changes made in the Am recovery line

Response: Still need to address

27c. Demand to locate and sample drums containing ash from the 1969 Fire

Response: RAC determined that drums are not available because they have been shipped to Idaho for burial.

Letter to Normie Morin (CDH) from EIN date 11/15/92. RF Dose Reconstruction Slide Presentation Review Comments.

23. Liquid effluent releases. EIN state that Rocky Flats has historically discharged up to 40 million gallons a month of waste water into these streams until the Cities surrounding the plant insisted on diverting the water flows in 1990.

Response: RAC addressed the effect of historical releases of materials in liquid effluents to surface water in the Surface Water Report. The assessment focused on the earlier years of operations, prior to the construction of the diversions.

Letter from EIN to CDH dated 6/1/94. An Open Letter to the HAP welcoming the new DOE representative on the HAP and clarifying EIN's background and level of involvement with the CDH RFP DRP.

6a. Dioxin: Information in the presentation on dioxin appeared to be purposely biased, solely based on DOE, RFP, CDH etc. sources on information.

Response: Dioxin has been considered thoroughly in Phase II. RAC discussed the dioxin and incinerator issues at the technical sessions of the Health Advisory Panel, and experts in the field were invited to participate in a day-long meeting with the HAP. RAC has prepared several reports and technical memoranda on the topic: Incinerators at Rocky Flats Plant, H. Grogan, March 11, 1994; Analysis of Dioxin Emissions and Risks from the Rocky Flats Plant Incinerators: Methods for Assessing the Release of Dioxins; Review of Incinerators and Other Combustion Sources at the Rocky Flats Plant and Bounding Estimate Calculations for the Incinerator in Building 771, P. McGavran and P.G. Voillequé, dated August 1995; Acquiring and Analyzing Incinerator Ash Samples for Dioxins, P. McGavran, July 1995; A Summary of Incinerators Operating in the Denver Area, P. McGavran, July 1995.

8b. Dioxin: Independent sources for alternative presentations should be sought.

Response: Independent experts were brought in to discuss dioxin in February 1995 (HAP meeting). Dr. Paul Connett and Dr. Tom Tiernan were speakers. (add references)

Letter from MGA/Thompson to EIN dated 1/27/95. Acknowledgment of receipt of information regarding thermal processes at RFP that could be attributed to dioxin pollution.

Response: Addressed by Pat McGavran; see above response.

Memo from EIN to MGA/Thompson dated 1/26/95.

Possible source points for dioxins at RFP.

Response: Addressed by Pat McGavran.

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5b. Light uranium ash bulldozed into Woman Creek has not been considered

Response: Releases to Woman Creek have been addressed within the scope of the surface water analysis by Kathleen Meyer. Releases of material from this area would appear in the analysis to Woman Creek. Terrol Winsor will also look at interviews.

An Open Response to Colorado Department of Health (CDH) Newsletter "The Update" submitted by EIN 5/25/93.

5i. Undocumented releases are critical in considering possible doses.

Response: RAC believes that it is unlikely there are significant undocumented releases or that if they did occur the impact is masked by the effects of larger releases being taken into account. The Task 4 report helps to better understand if there were large undocumented releases. Based on our analysis of the environmental data, it is not likely large undocumented releases occurred.

Memo to John Till (RAC) from Paula Elofson-Gardine (EIN) dated 4/5/94. Regarding Confidentiality policy.

Follow up of TLD records that may reveal undocumented accidents, (15. TLD data) and secondary contamination of the community by subcontractors leaving RFP with contaminated materials or equipment; (5. additional source terms)

Response: RAC believes that external exposure information derived from TLDs is unreliable for indicating accidents on-site or off-site. TLDs are useful in addressing worker exposures.

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15. Use of TLD data to track undocumented events

Response: RAC believes that external exposure information derived from TLDs is unreliable for indicating accidents onsite or offsite.

Letter to Marilyn Case (RAC) from Paula Elofson-Gardine (EIN) dated 10/8/93. Response to the proposed keywords for use in the database search. Topics of interest to EIN are evident from the keywords suggested.

5. Potential contaminant release sources not yet considered in the study.

Response: RAC believes that it is unlikely there are significant undocumented releases or that if they did occur the impact is masked by the effects of larger releases being taken into account. The Task 4 report helps to better understand if there were large undocumented

releases. Based on our analysis of the environmental data, it is not likely large undocumented releases occurred.(1995 (All correspondence is included in the [Appendix](#) in chronological order).

5b. several tons of uranium ash bulldozed into the Woman Creek Drainage

Response: Releases to Woman Creek have been addressed within the scope of the surface water analysis. Releases of material from this area would appear in the analysis to Woman Creek.

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5b. Are spent HEPA filters or other accident clean up residues disposed of in the 881 Hillside? Clean Up Commission considered this possible based on monitoring data in the 881 Hillside IM/IRA document (DOP gas, phthalate). Dick Fox with CDH was to determine what disposal practices were utilized.

Response: Still need to consider

ANALYTICAL PROCEDURES: AVERAGING METHODS AND RESULTS

Health Advisory Panel's Outreach Effort

Letter from EIN to CDPHE dated 2/8/95. Response to CDPHE's response.

3f. EIN would like the issue of primary and secondary dispersion or fallout patterns of releases by Rocky Flats to be examined in more detail. In particular, weaknesses in integrated spatial analyses of soil data using kriging techniques (3d); combining or compositing samples misses hot spots ((3e) averaging methods); EIN ask if false low values are caused by dilution of samples by collection of a profile that is then added to the composite sample?

Response: Looking at resuspension and dispersion in great depth. Soil data are not being used for dosimetry, only to check with model predictions.

Response: The effect of averaging results and the issue of hot spots are being looked at through spreadsheet calculations [903 Area Dosimetry Spreadsheet: How does it work and what does it tell us? (J.M. Weber, A.S. Rood, P.G. Voillequé, K.R. Meyer, H.R. Meyer, J.E. Till). September 1996. (All correspondence is included in the [Appendix](#) in chronological order).

This has also been addressed in a technical memo [Hypothetical Exposure Assessment Using On-Site Air Monitoring Data (What's in an Average?); S.K. Rope; December 1995] and is discussed in the Task 4 report. (All correspondence is included in the [Appendix](#) in chronological order).

Response: All monitoring data are carefully considered as to their value. RAC has examined sample bias and efficiency and is considering this in its use of monitoring information.

Memo from EIN to CDH dated 3/14/94. EIN comments regarding - Briefing Book 15: Concerns raised by members of the public to the Rocky Flats Dose Reconstruction Project (RFDRP).

3e. EIN object to release data being presented on an annual basis when monthly data are available because significant release event(s) may be obscured.

Response: Where smaller resolution data are available and can be applied, RAC will do so. The problem is a complex one. For example, data on wind gusts are being addressed on a minute by minute basis in our analysis.

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

3e. Concern that averaging surface soil concentrations artificially reduces the result

Response: The effect of averaging results and the issue of hot spots are being looked at through spreadsheet calculations. This has also been addressed in a technical memo and is discussed in the Task 4 report. (Sue Rope technical memo and Jill Weber memo.) (All correspondence is included in the [Appendix](#) in chronological order).

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3e. Problem with averaging concentrations; maxima and spikes are missed

Response: The effect of averaging results and the issue of hot spots are being looked at through spreadsheet calculations. This has also been addressed in a technical memo and is discussed in the Task 4 report. (Sue Rope technical memo and Jill Weber memo.)

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3e. Concern that use of average release data will hide spikes in releases

Response: The effect of averaging results is being considered through spreadsheet calculations [903 Area Dosimetry Spreadsheet: How does it work and what does it tell us?; J.M. Weber, A.S. Rood, P.G. Voillequé, K.R. Meyer, H.R. Meyer, J.E. Till; September 1996.] This has also been addressed in a technical memo [Hypothetical Exposure Assessment Using On-Site Air Monitoring Data (What's in an Average?); S.K. Rope; December 1995] and is discussed in the Task 4 report.

32. Concern about exposure to chronic long term releases versus repeated acute short term releases with possible exposures to accident releases.

Response: The effect of averaging results is being considered through spreadsheet calculations [903 Area Dosimetry Spreadsheet: How does it work and what does it tell us?; J.M. Weber, A.S. Rood, P.G. Voillequé, K.R. Meyer, H.R. Meyer, J.E. Till; September 1996.] This has also been addressed in a technical memo [Hypothetical Exposure Assessment Using On-Site Air Monitoring Data (What's in an Average?); S.K. Rope; December 1995]. This issue is also considered in the plutonium risk report as acute vs. chronic exposure [Task 3: Assessing Risks of Exposure to Plutonium; H.A. Grogan, W.K. Sinclair, P.G. Voillequé; August 1996.] (All correspondence is included in the [Appendix](#) in chronological order).

PLOWING LANDS AROUND ROCKY FLATS

Health Advisory Panel's Outreach Effort

Letter from EIN to CDPHE dated 2/8/95. Response to CDPHE's response.

5c. possible public exposure during plowing of contaminated land involved in the Church property lawsuit

Response: Sue Rope did follow up on this and located a site memorandum (not original data) on special air sampling that was done during the plowing; this will be covered in the Task 4 report. These data are most useful in looking at the resuspension factor associated with plowing. We are not looking at air monitoring data to do direct exposure assessment. The exposure assessment aspects of this will be in the 903 risk assessment report.

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5c. Some of the Church lands had redistribution of contaminants through plowing.

Response: See response above.

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

5c. Lands associated with the Church v Dow and Rockwell, 1978 should be considered as source terms: plowing, wind, rain, surface water runoff etc.

Response: See response above.

22 Page letter to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

30. Statement that EML removed its monitors from RFP because the proximity of the plant skewed the fallout statistics

Response: This is a possibility; the issue of removing samplers because of fallout could be the case, but may be more likely that their research was completed. We have been in contact with the EML regarding other work.

5c. Lands associated with the Church v Dow and Rockwell, 1978 should be considered as source terms : plowing, wind, rain, surface water runoff etc.

Response: Sue Rope did follow up on the special air monitoring that was set up for this plowing. This and the other issues of surface runoff are discussed in the Task 4 report. These data are most useful in looking at the resuspension factor associated with plowing. As noted above, we are not looking at air monitoring data to do direct exposure assessment. The exposure assessment aspects of this will be in the 903 risk assessment report.

METEOROLOGICAL ISSUES

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

25d. meteorology: sustained frontal downdraft wind storms contributed to a massive redistribution of contamination away from RFP toward Denver Metro area

Response: see 25a above. This issue is addressed in the extensive meteorological modeling performed by RAC and reported in Performance Evaluation of Atmospheric Transport Models for Use in the Rocky Flats Dose Reconstruction Project, A. Rood, draft December 1995; final December 1996.

Health Advisory Panel's Outreach Effort

Letter from EIN to MGA/Thompson dated 1/10/95. MGA/Thompson Outreach Presentation Outline for Historical Public Exposures Studies on Rocky Flats.

3f. Primary fallout patterns for airborne plutonium releases reflect localized micrometeorological patterns, and the secondary patterns are influenced by mesometeorological patterns.

Response: RAC has evaluated extensively the meteorological dispersion in the area. These questions are considered in our dispersion analysis which is substantially more detailed than previous studies on the site. See reference noted above.

Letter from EIN to CDH dated 6/1/94. An Open Letter to the HAP welcoming the new DOE representative on the HAP and clarifying EIN's background and level of involvement with the CDH RFP DRP.

8c. Independent scientist's studies have not been incorporated or included in the RFDRP study. Information from Dr. Gale Biggs has not been incorporated.

Response: RAC has exchanged letters with Dr. Biggs. His ideas and those of other independent scientists are being considered in our work. Also, Dr. Biggs and others have received our reports for their input and review.

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25a. Concern that the Stapleton Airport data were used for meteorological data. Why wasn't Jefferson County Airport data used as the RFP wind rose is opposite to Stapleton's? Susan Hurst suggested Boulder Municipal airport may have better data. Gale Biggs supported this idea.

Response: RAC has obtained extensive additional meteorological data and is using it in the dose reconstruction; furthermore, Jefferson county airport is not open 24 hours a day, which makes the usefulness of the meteorological data somewhat limited.

25b. Cross network that has generated 50,000 meteorological maps: Kim Grice considered it a waste of information not to use it.

Response: RAC has reviewed and considered many sources of meteorological data for the Phase II dispersion modeling work. This information will be included in the individual risk assessment reports. See also Task 3a: Performance Evaluation of Atmospheric Transport Models for Use in the Rocky Flats Dose Reconstruction Project, A. Rood, draft February 1996, final December 1996 (All correspondence is included in the [Appendix](#) in chronological order).

25c. 903 Pad: question regarding the use of meteorological data from 1987 to 1991 and how it was different from the mid 1960s to 1972 when there were turbulent winds.

Response: Releases from the 903 are being address in the source term report. Detailed meteorology data have been located and are being used.

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28. 903 Pad: no account of alpha recoil effect on dispersion

Response: The alpha recoil effect is considered in evaluating counting and data quality issues. Chapter 3 in the Task 4 report discusses these issues in some detail. An article by W.J. McDowell, F.G. Seeley and M.T. Ryan (Penetration of HEPA-filters by alpha recoil aerosols, May 1977, Health Physics Vol. 32) states that "alpha-emitting particulate matter penetrates HEPA media more effectively than nonradioactive or beta-gamma-active aerosols, given a long enough test."

29. 903 Pad: problems with particle size distribution data

Response: Particle size is being considered in the 903 Pad Source Term and risk assessment reports.

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25c. 903 Pad: problem with the use of 1987-91 meteorological data because there was less turbulent wind during that time than there was during the mid 60s to 1972.

Response: Releases from the 903 are being addressed in the source term report. Detailed meteorology data have been located and are being used.

Letter(22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

39. 903 Pad is not the only source of resuspended activity from RFP

Response: RAC agrees with this statement and is considering other sources of resuspended activity such as the solar ponds.

41. 903 Pad source term: was material from the 1964 Pu/CCl₄ explosion taken to the pad?

Response: RAC does not have the answer to this question. It is likely that some of the material was taken to the 903 Pad and it would be accounted for in the 903 Pad source term.

42. 903 Pad source term: failure to talk to workers e.g. Jerry Hardin

Response: RAC did talk with Jerry Hardin and other workers in its interview of workers.

44. Core sampling data from the 903 pad should be obtained and evaluated

Response: RAC has reviewed several papers mentioning the sampling wells drilled at the four corners of the asphalt pad placed over the 903 area in November of 1969. The key paper is, "Barrick, C.W. Analysis of soil from under the pad for plutonium (attached to a review of the RFP waste oil drum leak incident, 1958 - 1970). October 1980". The papers discuss radiation measurements made in those well holes at the time. The measurements are not linked to soil sample analyses, and is not very useful for estimating plutonium concentrations. Also, since the holes were drilled after completion of the asphalt pad, plutonium concentrations are likely to have been different than those at the time of the main suspension events in late 1968

and early 1969. By the time of pad placement, grading and other disturbances had taken place. We have not used these data in developing our soil concentration or release estimates, for these reasons. This issue is discussed in the 903 Area Characterization Report, issued in December 1996.

EXPOSURE ASSESSMENT

Memo to John Till (RAC) from Paula Elofson-Gardine (EIN) dated 4/5/94. Regarding Confidentiality policy.

CSU urine testing for Pu in local residents;

Response: Urine testing results are briefly reviewed in the Task 4 and 5 reports. This monitoring may be helpful but only to a limited degree for the dose reconstruction. CSU is expecting to come out with more in late 1997.

3g. According to EIN, residents and HAP members have been misled into thinking that the urine analysis results for local residents are meaningful. Urine testing for Pu uptake is not an efficient means of demonstrating body burdens due to translocation dynamics.

Response: Urine testing results are considered in the Task 4 and 5 reports. This monitoring may be helpful but only to a limited degree for the dose reconstruction.

Letter to Norma C. Morin (CDH) from Thomas P. Courtney, 9/92. Critique of Rocky Flats Toxicological Review and Dose Reconstruction Feb. 92 Tasks 3 & 4 Final Draft Report for CDH Health Advisory Panel, Loews Giorgio Hotel, 24 September 1992. Includes appendices and references.

24. Vanadium lung disease should be considered as an endpoint

Response: Vanadium compounds were considered by ChemRisk in the Phase I screening. Vanadium Nitrate was listed as ChemRisk priority 1 chemical unique to the 1974 hazardous materials inventory, with a quantity of 0.02 kg. Vanadium AqV2 100 and vanadium solution 3165 were listed as ChemRisk priority 2 chemicals, with quantities in the 1988-1989 Inventory of 0.01 kg and 0.025 kg. Vanadium 1000 ppm and vanadium standard solution were listed as priority 3 chemicals with quantities of 0.500 and 0.025 kg.

Vanadium carbide, vanadium metal, vanadium nitride, vanadium pentoxide, vanadium nitrate, vanadium silicide, and vanadium sulfate were listed in the 1988-1989 hazardous materials inventory. ChemRisk appropriately evaluated vanadium pentoxide separately because its toxicity differs from vanadium metal and other vanadium compounds. These compounds, the quantity of each and the total quantity used for the screening are listed in Appendix I of the Phase I Task 2 Report, June 1991. Due to the small inventory amounts and the ratio of actual to allowable quantity being far less than one, the compounds were screened out and vanadium was not listed as a chemical of concern in the Phase I, Task 3 and 4 Report.

Vanadium compounds have a wide variety of uses. They are used as an alloying agent in the steel industry, in the manufacture of alloys used in jet aircraft engines, as catalysts, color-modifiers and corrosion inhibitors. The Phase I reports did not describe the use of vanadium compounds at the Rocky Flats Plant. It is not mentioned in the Historical Release Reports. I asked Carl Spreng with CDPHE, Steve Cunningham, Manager of the Classification Office at

the RFP, and Dick Hill, Program Manager for Special Nuclear Material Packaging and Shipping with Safe Sites of Colorado at the Rocky Flats Plant, for information on vanadium use at the plant. Vanadium metal was used at the site to form weapons components. Some details of its use are classified. It was provided by Teledyne Wah-Chang as pure metal which was shaped in Building 883 then machined (wet) in Buildings 460 and 444 to make metal parts. Based on the number of weapons parts built, Dick Hill estimated that about 16,000 pounds of vanadium was used at the plant from May 1983 to December 1989 when vanadium parts were being produced. This estimate was based on material balance information about the number of pits produced, the percentage which were vanadium and the amount of vanadium recycled. Because vanadium was expensive, all of the scrap, turnings and defective parts were recycled.

It appears that workers were concerned about safety when working with vanadium, largely because of the industrial hygiene concerns and protective measures being put in place for the beryllium work. Vanadium releases to ambient air does not appear to have been a concern.

Vanadium is not a risk driver for the Remedial Investigation and Remedial Facility Investigation for CERCLA and RCRA. Vanadium is not listed as a contaminant of concern for the trenches, ponds or process areas. Vanadium was not above background in OU2 subsurface or surface soils or groundwater. It was listed as a preliminary chemical of concern for soil in OU6, where it was detected at levels greater than background in surface soil and in pond and stream sediments. The toxicity screen for OU6 conducted for soil indicated that vanadium is not present at levels which could present a health risk.

Phase I evaluations considered vanadium and eliminated the metal from the list of chemicals of concern for the Dose Reconstruction Study. This letter documents what RAC has discovered in Phase II about the quantities and use of vanadium at the RFP. We have found no evidence to suggest that vanadium was released in quantities to have presented a health hazard off-site. If you have additional information on the use and release of vanadium and why it may be a concern, please share that information with us.

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32. Concern about exposure to chronic long term releases versus repeated acute short term releases with possible exposures to accident releases.

Response: See 3e. above and the Task 4 report. This issue is also considered in the plutonium risk report as acute vs. chronic exposure.

9/24/92 Technical Session Minutes; critique of the Tasks 3 & 4 Report (Phase I) was presented by Tom Courtney at the meeting. Key items noted in the minutes are listed below.

36. Bodies should be exhumed to test for Pu, Am, U, Cs and beryllium to see what has been taken up in bodies.

Response: This issue is of limited use to dose reconstruction. Information is being collected by the transuranium registry that includes biological samples. Tissues collected Cobb are now at CSU.

Letter (22 page) to CDH/HAP from EIN concerning the response to EIN's review of the draft Task 3&4 report, dated September 21, 1992.

15. Worker TLD records are directly relevant to the study

Response: RAC believes that external exposure information derived from TLDs is unreliable for indicating accidents on-site or off-site. TLDs are useful in addressing worker exposures, but for the Rocky Flats Plant, worker exposure is a complex issue and not within the scope of this study.

Letter to ENSR from EIN, dated 7/13/92. Response to fax sent 7/10/93 containing material for review.

32. What are the health problems associated with chronic versus acute exposures?

Response: This issue is addressed in the report on uncertainty associated with plutonium risk.

APPENDIX**Previous RAC Responses To Specific Concerns Raised By Members of the Public**

- [Letter and Responses to Questions Submitted to the HAP by Dr. Kemper, from Dr. J.E. Till, dated January 31, 1994;](#)
- [Response to Question 11 from W.A. Kemper regarding actinide concentrations in cattle grazing near the Rocky Flats Plant, S.K. Rope, 3/10/94.](#)
- [Responses to Concerns Raised by Environmental Information Network and Concerned Citizens to the Rocky Flats Dose Reconstruction Project, dated May 13, 1994;](#)
- [Responses to Questions from William Kemper Concerning the Rocky Flats Dose Reconstruction Project, June 4, 1994.](#)

Compilation of Correspondence And Documents Supporting RAC Responses To Environmental Information Network Concerns

- [Verification of the Ralston School Soil Sampling Location Following the 1957 Fire, RAC Team, 7/93](#)
- [Health Advisory Panel Policy on Interviews, John Till, 9/6/94](#)
- [Bibliographic Search Risk Factors for Beryllium, Plutonium, Chlorinated Hydrocarbons, B. Shleien, 12/93](#)
- [Particle size information for plutonium, P.G. Voillequé, 1/4/94](#)
- [Letter Regarding Methyl Ethyl Ketone as a Contaminant of Concern, P. McGavran, 8/13/94](#)
- [Status Report of Document Review for the Rocky Flats Dose Reconstruction Project, T. Winsor, 9/94](#)
- [Final Progress Report-Documents Search of Department of Energy Documents Washington, DC Area for Rocky Flats, B. Shleien, 11/18/94](#)
- [Question of the possible occurrence of criticality at the Rocky Flats Plant, P. Voillequé, 1/5/95, 1/26/95](#)
- [Response to question about the mass of plutonium per volume of air, S.K. Rope, 2/28/95](#)
- [Response to question about early air sampling filters, P. Voillequé, 4/7/95](#)
- [The Question of Historical Carbon Tetrachloride Use in the Denver Area, P. McGavran, 4/17/95](#)
- [Response to Comments on the outreach presentation for the Rocky Flats Study, J.E. Till, 4/18/95](#)
- [Response to Question About the Increased Sensitivity of Alcoholics to Carbon Tetrachloride, P. McGavran, 4/27/95](#)
- [Response to Question about the Ribbon Laser System at Rocky Flats, P. Voillequé, 5/7/95](#)
- [Examination of Mass Balance Accounting as a Means for Estimating Pu Releases: HAP transcripts 5/95, P. Voillequé, 5/95](#)
- [Collection Efficiency of Ambient Air Samplers, S.K. Rope, 5/19/95](#)

- [Acquiring and Analyzing Incinerator Ash Samples for Dioxins, P. McGavran, 7/29/95](#)
- [A Summary of Incinerators Operating in the Denver Area, P. McGavran, 7/95](#)
- [Interviews: Status and Projections, T.F. Winsor, 8/95](#)
- [Hypothetical Exposure Assessment Using On-Site Air Monitoring Data \(What's in an Average?\), S.K. Rope, 12/95](#)
- [Document Review and Interviews: Status and Projections, T. Winsor, 4/96](#)
- [Follow-up on documents in boxes from unknown origin and request for copies, K. Meyer, 4/96](#)
- [Review of boxes of indices of microfilm documents at RFP, K. Meyer, 4/18/96](#)
- [Question of CCl₄ being used as a fire extinguisher at Rocky Flats, P. McGavran, 6/21/96](#)
- [Question about the availability of pond sediment sampling data for CCl₄, P. McGavran, 6/26/96](#)
- [903 Area Dosimetry Spreadsheet: How does it work and what does it tell us?, J.M. Weber, A.S. Rood, 9/96](#)